

§ 27.151

(1) With altitude, from standard sea level conditions to the maximum take-off and landing altitude capability of the rotorcraft or 7000 feet density altitude, whichever is less; with—

- (i) Critical Weight;
- (ii) Critical center of gravity;
- (iii) Critical rotor r.p.m.;

(2) For takeoff and landing altitudes above 7000 feet density altitude with—

- (i) Weight selected by the applicant;
- (ii) Critical center of gravity; and
- (iii) Critical rotor r.p.m.

(d) Wind velocities from zero to at least 17 knots, from all azimuths, must be established in which the rotorcraft can be operated without loss of control out-of-ground-effect, with—

- (1) Weight selected by the applicant;
- (2) Critical center of gravity;
- (3) Rotor r.p.m. selected by the applicant; and

(4) Altitude, from standard sea level conditions to the maximum takeoff and landing altitude capability of the rotorcraft.

(e) The rotorcraft, after (1) failure of one engine in the case of multiengine rotorcraft that meet Transport Category A engine isolation requirements, or (2) complete engine failure in the case of other rotorcraft, must be controllable over the range of speeds and altitudes for which certification is requested when such power failure occurs with maximum continuous power and critical weight. No corrective action time delay for any condition following power failure may be less than—

(i) For the cruise condition, one second, or normal pilot reaction time (whichever is greater); and

(ii) For any other condition, normal pilot reaction time.

(f) For helicopters for which a V_{NE} (power-off) is established under § 27.1505(c), compliance must be demonstrated with the following requirements with critical weight, critical center of gravity, and critical rotor r.p.m.:

(1) The helicopter must be safely slowed to V_{NE} (power-off), without exceptional pilot skill, after the last operating engine is made inoperative at power-on V_{NE} .

(2) At a speed of 1.1 V_{NE} (power-off), the margin of cyclic control must

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allow satisfactory roll and pitch control with power off.

(Secs. 313(a), 601, 603, 604, and 605 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1421, 1423, 1424, and 1425); and sec. 6(c) of the Dept. of Transportation Act (49 U.S.C. 1655(c)))

[Doc. No. 5074, 29 FR 15695, Nov. 24, 1964, as amended by Amdt. 27-2, 33 FR 963, Jan. 26, 1968; Amdt. 27-14, 43 FR 2325, Jan. 16, 1978; Amdt. 27-21, 49 FR 44433, Nov. 6, 1984; Amdt. 27-44, 73 FR 10999, Feb. 29, 2008]

§ 27.151 Flight controls.

(a) Longitudinal, lateral, directional, and collective controls may not exhibit excessive breakout force, friction, or preload.

(b) Control system forces and free play may not inhibit a smooth, direct rotorcraft response to control system input.

[Amdt. 27-21, 49 FR 44433, Nov. 6, 1984]

§ 27.161 Trim control.

The trim control—

(a) Must trim any steady longitudinal, lateral, and collective control forces to zero in level flight at any appropriate speed; and

(b) May not introduce any undesirable discontinuities in control force gradients.

[Doc. No. 5074, 29 FR 15695, Nov. 24, 1964, as amended by Amdt. 27-21, 49 FR 44433, Nov. 6, 1984]

§ 27.171 Stability: general.

The rotorcraft must be able to be flown, without undue pilot fatigue or strain, in any normal maneuver for a period of time as long as that expected in normal operation. At least three landings and takeoffs must be made during this demonstration.

§ 27.173 Static longitudinal stability.

(a) The longitudinal control must be designed so that a rearward movement of the control is necessary to obtain an airspeed less than the trim speed, and a forward movement of the control is necessary to obtain an airspeed more than the trim speed.